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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/729,443	12/04/2000	Steven T. Jaffe	36928/NJP/B600	6265

23363 7590 02/10/2006

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EXAMINER	
TORRES, JUAN A	
ART UNIT	**PAPER NUMBER**
2631	

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/729,443	JAFFE ET AL.	
	Examiner	Art Unit	
	Juan A. Torres	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 January 2006.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-16,18-22,24-28,30-42,44-48,50-54 and 56-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-16,18-22,24-28,30-42,44-48,50-54 and 56-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

In view of the amendment filed on 01/20/2006, the Examiner withdraws the 35 USC § 112 rejection to claims 9, 13-14 and 38-39 of the previous Office action.

Response to Arguments

Applicant's arguments filed on 01/20/2006 have been fully considered but they are not persuasive.

The Applicant contends, "Support for a third signal between the first and second signals where the Viterbi decoding of the first signal is not based on the third signal starts is provided throughout the specification and drawings. For example, in the paragraph starting on page 3, line 34 that describes Figure 2. According to this paragraph "The outputs of trellis encoders 203 and 207 are then punctured by switch 209. In other words, switch 209 selects between the output of trellis encoder 203 and trellis encoder 207. The punctured output of turbo encoder 200 is then provided to a channel 211." Further the paragraph starting on line 34 of page 4 of the specification continues that "switch 303 is added to the Viterbi decoder 301 so that only the symbols from trellis encoder 203 or trellis encoder 207 are used by the phase detector 217 to adjust the controlled oscillator 223.... Switch 303 will select every other symbol. Either a symbol from trellis encoder 203 will be selected or a symbol from trellis encoder 207 will be selected by switch 303."

The above passages indicate that if a third signal is inserted between the originally consecutive first and second signals that are from trellis encoder 203, this third

signal is due to puncturing by the switch 209 and should not be used for the decoding process because it has been interleaved and encoded by a second and possibly different trellis encoder 207. These passages support the above rejected claims as amended. Accordingly, it is respectfully requested that the 35 U.S.C. 5112 rejections be withdrawn".

The Examiner disagrees and asserts, as indicated in the previous office action, that the disclosure doesn't teach the use of a third signal between the first and second signal. For these reasons and the reasons indicated in the previous Office action the rejection of claims 9, 13-14,38-39 and 46 are maintained.

The Applicant contends, "Claims 1-3, 5-8, 10-11, 15-16, 18-19, 21-22, 24-25, 27-28, 30-31, 33-36, 40-42, 44-45, 47-48, 50-51, 53-54, and 56-59 are rejected under 35 U.S.C. 102(a) as being anticipated by Langlais et al., an IEEE publication, with a date of publication of November 22, 1999. Claims 9, 13 - 14, 38 - 39 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langlais in view of Divsalar (U.S. Patent No. 6,023,783). Claims 12, 20, 26, 32, 37, 52, and 59 - 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langlais in view of Robertson et al. another IEEE publication.

Enclosed is a declaration under 37 CFR 1.131 by the inventors of the above application showing a date of invention for the claimed subject matter of the application prior to the publication date of Langlais. Therefore, Langlais does not constitute a prior art for the above application. Accordingly, it is respectfully requested that the above rejection be withdrawn.

Applicants respectfully submit that all of the claims currently pending in this application are allowable over the cited reference, and reconsideration and allowance of this application are respectfully requested.".

The Examiner disagrees and asserts, that:

The declaration filed on 01/20/2006 under 37 CFR 1.131 has been considered but is ineffective to overcome the Langlais reference.

The evidence submitted is insufficient to establish diligence from a date prior to the date of reduction to practice of the Langlais reference to either a constructive reduction to practice or an actual reduction to practice. The declaration under 37 CFR 1.131 filed on 01/20/2006 states: "2. On or before July of 1999, we conceived the invention claimed in the above identified application. We then prepared a written description of the invention on or before September 22, 1999 and an invention disclosure describing exemplary embodiments of the invention on or before October 5, 1999. We presented the invention disclosure to our patent attorney, Mr. D. Bruce Prout of Christie, Parker & Hale, in a facsimile transmitted on October 11, 1999. A true and correct copy of the invention disclosure, with some of the handwritten markings redacted, is attached hereto as Exhibit A to this Declaration. 3. We worked diligently with our patent attorney to prepare a provisional patent application describing the subject matter set forth in the invention disclosure and claimed init is not deligence the above identified patent application. Subsequently, on December 3. 1999, the provisional patent application was filed with the U.S. Patent and Trademark Office", but,

a) The fax sent on October 23 1999,

b) Pages 1 and 8-13 are missing, and

c) The fax is identical to the provisional patent application filed on December 3, 1999,

so, it is not diligence showing from a date prior to the date of reduction to practice of the Langlais reference to either a constructive reduction to practice or an actual reduction to practice.

The evidence submitted is insufficient to establish a conception of the invention prior to the effective date of the Langlais reference. While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by a complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See *Mergenthaler v. Scudder*, 1897 C.D. 724, 81 O.G. 1417 (D.C. Cir. 1897). Exhibit A and the provisional paten application (identical papers) don't disclose receiving first and second signals each being modulated on a carrier signal, the first signal preceding the second signal in time; multiplying each of the first and second signals with a reference signal having a reference frequency; Viterbi decoding the multiplied first signal based on the multiplied first and multiplied second signals; comparing the Viterbi decoded first signal to the multiplied first signal; adjusting the reference frequency as a function of the comparison; and turbo decoding a signal with adjusted frequency, as claimed.

The evidence submitted is insufficient to establish a reduction to practice of the invention in this country or a NAFTA or WTO member country prior to the effective date

of the Langlais reference. Exhibit A and the provisional paten application (identical papers) don't provide any simulation results or any proof of reduction to practice.

For these reasons and the reasons indicated in the previous Office action the rejection of claims 1-3, 5-8, 10-11, 15-16, 18-19, 21-22, 24-25, 27-28, 30-31, 33-36, 40-42, 44-45, 47-48, 50-51, 53-54, and 56-59 are maintained.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9, 13-14, 20, and 38-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure doesn't teach the use of a third signal between the first and second signal.

Claim 46 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure doesn't teach the use of a third signal where the Viterbi decoding of the multiplied third signal is not based on the received third signal.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

NOTE: Because it is not support in the provisional application of the claimed invention, the benefit of the provisional application is not granted, for that reason the rejections to the claims under 35 USC 102(a) from the previous Office action, are chanted to rejections under statutory bar 35 USC 102(b) in the present Office action.

Claims 1-3, 5-8, 10-11, 15-16, 18-19, 21-22, 24-25, 27-28, 30-31, 33-36, 40-42, 44-45, 47-48, 50-51 and 53-54, 56-59 are rejected under 35 U.S.C. 102(a) as being anticipated by Langlais et al. ("Synchronization in the carrier recovery of a satellite link using turbo-codes with the help of tentative decisions", IEE Colloquium on Turbo Codes in Digital Broadcasting - Could It Double Capacity? 22 Nov. 1999 pages: 5/1 - 5/7).

As per claim 1 Langlais et al. teach a method of processing signals, comprising receiving first and second signals each being modulated on a carrier signal, the first signal preceding the second signal in time (figure 2 page 5/1 section II.A); multiplying each of the first and second signals with a reference signal having a reference frequency (figure 2 multiplier after y(k) page 5/1 section II.A); Viterbi decoding the multiplied first signal based on the multiplied first and multiplied second signals (figure 2 phase detector page 5/1 section II.A, the Viterbi decoding is done in DEC1 and feed to the mapper); comparing the Viterbi decoded first signal to the multiplied first signal

(figure 2 phase detector page 5/1 section II.A); adjusting the reference frequency as a function of the comparison (figure 2 output of loop filter page 5/1 section II.A); and turbo decoding a signal with adjusted frequency (figure 2 modulo of turbo-decoder pages 5/1-5/2 section II.A).

As per claim 2 Langlais et al. teach a method where the first and second signals each comprises turbo-encoded data (figure 2 page 5/1 section II.A first paragraph).

As per claim 3 Langlais et al. teach that the multiplied first and multiplied second signals each comprises a baseband signal (figure 2 output of mapper page 5/1 section II.A first paragraph and reference [7]).

As per claim 5 Langlais et al. teach that the comparison of the Viterbi decoded first signal with the multiplied first signal comprises detecting a phase difference between the Viterbi decoded first signal and the multiplied first signal (figure 2 and page 5/1 section II.A).

As per claim 6 Langlais et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase difference between the Viterbi decoded first signal and the multiplied first signal (figure 2 and page 5/1 section II.A, the VCO in inherited in the PLL see figure 3).

As per claim 7 Langlais et al. teach that the adjustment of the reference frequency comprises adjusting the reference frequency to be substantially equal to a frequency of the carrier signal (figure 2 and page 5/2 section III.A).

As per claim 8 Langlais et al. teach that the first and second received signals each comprises a symbol representing a constellation point, and where the Viterbi

decoded of the multiplied first signal comprises quantizing the multiplied first signal to its nearest constellation point as a function of the multiplied first and multiplied second signals (figure 2 and page 5/1 section II.A).

As per claim 10 Langlais et al. teach that the transmitting signals including the first and second signals, where the receiving of the first and second signals comprises receiving the transmitted signals (figure 2 and page 5/1 section II.A).

As per claim 11 Langlais et al. teach that the transmission of the signals comprises turbo encoding the signals before transmission (figure 2 and page 5/1 section II.A inherit to the turbo decoder will be a turbo encoder).

As per claim 15 Langlais et al. teach a receiver, comprising: an oscillator having a reference signal output with a tunable reference frequency (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3); a multiplier to multiply a first signal with the reference signal, and to multiply a second signal, succeeding the first signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); a Viterbi decoder to adjust the multiplied first signal based on the multiplied first and multiplied second signals (figure 2 block in dot lines label module of turbo-decoder page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); and a detector to compare the adjusted first signal with the multiplied first signal, the detector being adapted to tune the reference frequency as a function of the comparison (figure 2 phase detector page 5/1 section II.A).

As per claim 16, 22 and 28 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3).

As per claim 18, 24 and 30 Langlais et al. teach that the in the Turbo4, the trellis length of DEC1 is equal to 29 bits which limits the number of accessible decoded symbols to 29 for a 1/2 rate encoder. Therefore, the possible values that delay Tr can take a: 0 α Tr α 28Ts where Ts is the symbol duration and Tr=dTs In the case of zero delay tentative decision, the extraction is performed at the input of the trellis. The decision results from the selection of the trellis path just after the corresponding bits have entered the DEC1 decoding trellis, this case does not consider future values of the signal only past values (page 5/2 first paragraphs).

As per claim 19, 25 and 31 Langlais et al. teach that the detector comprises a phase detector to compare a phase of the adjusted first signal with a phase of the multiplied first signal, the phase detector being adapted to tune the reference frequency as a function of a difference in phases (figure 2 phase detector page 5/1 section II.A).

As per claim 21 Langlais et al. teach a receiver, comprising an oscillator having a tuning input (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3); a multiplier having a first input to receive a signal, and a second input coupled to the oscillator, the signal comprising a first signal and a second signal succeeding the first signal in time, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); a Viterbi decoder having an input coupled to the multiplier, and an output (figure 2 block in dot lines label module

of turbo-decoder page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); and a detector having a first input coupled to the Viterbi decoder input, a second input coupled to the Viterbi decoder output, and an output coupled to the tuning input of the oscillator (figure 2 phase detector page 5/1 section II.A).

As per claim 27 Langlais et al. teach a receiver, comprising oscillator means for generating a reference signal having a tunable reference frequency (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL); multiplier means for multiplying a first signal with the reference signal, and multiplying a second signal, succeeding the first signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); Viterbi decoder means for adjusting the multiplied first signal based on the multiplied first and multiplied second signals (figure 2 block in dot lines label module of turbo-decoder page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); and detector means for comparing the adjusted first signal with the multiplied first signal, the detector means comprises tuning means for tuning the reference frequency as a function of the comparison (figure 2 phase detector page 5/1 section II.A).

As per claim 33 Langlais et al. teach a method of processing signals having a first and second symbol each representing a constellation point, the first symbol preceding the second symbol in time, the method comprising Viterbi decoding the first symbol to its nearest constellation point as a function of the first and second signals (figure 2 d(k) output of the Viterbi decoder page 5/1 section II.A the Viterbi decoding is

done in DEC1 and feed to the mapper); comparing the first symbol to the Viterbi decoded first symbol (figure 2 phase detector page 5/1 section II.A); and adjusting a reference frequency as a function of the comparison (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 34 Langlais et al. teach a method of receiving the first and second symbols before the first symbol is Viterbi decoded (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 35 Langlais et al. teach a method of transmitting the signals including the first and second symbols, where the receiving of the first and second symbols comprises receiving the transmitted signals (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 36 Langlais et al. teach that the transmission of the signals comprises turbo encoding the first and second symbols before transmission (figure 2 page 5/1 section II.A first paragraph).

As per claim 40 Langlais et al. teach that the received first and second symbols are each modulated on a carrier frequency, the method further comprising multiplying each of the first and second symbols with a reference signal having the reference frequency (figure 2 multiplier page 5/1 section II.A first paragraph).

As per claim 41 Langlais et al. teach that the multiplication of the first and second modulated symbols each comprises recovering the respective symbol by removing the respective carrier frequency (figure 2 inherit to the multiplier page 5/1 section II.A first paragraph).

As per claim 42 Langlais et al. teach that the first and second symbols each comprises turbo encoded data (figure 2 page 5/1 section II.A first paragraph).

As per claim 44 Langlais et al. teach that the comparison of the first symbol with the quantized first symbol comprises detecting a phase difference between the first symbol and the Viterbi decoded first symbol (figure 2 phase detector page 5/1 section II.A first paragraph).

As per claim 45 Langlais et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase difference between the first symbol and the Viterbi decoded first symbol (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 47 Langlais et al. teach a receiver to receive a signal including first and second symbols each representing a constellation point, the first symbol preceding the second symbol in time, the receiver comprising a Viterbi decoder to quantize the first symbol as a function of the first and second symbols (figure 2 turbo-decoder block page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper); a detector to compare the first symbol to the quantized first symbol (figure 2 phase detector page 5/1 section II.A); and an oscillator having a tunable output as a function of the comparison (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 48 Langlais et al. teach that the first and second symbols are each modulated on a carrier frequency, the receiver further comprising a multiplier to multiply each of the first and second symbols with the oscillator output to recover its respective

symbol by removing its respective carrier frequency (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 50 Langlais et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A).

As per claim 51 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 53 Langlais et al. teach a communication system, comprising: a transmitter to transmit a signal including first and second symbols each representing a constellation point, the first symbol preceding the second symbol in time (page 5/1 section I and inherited in figure 2 and section II); and a receiver including a Viterbi decoder to quantize the first symbol as a function of the first and second symbols (figure 2 turbo-decoder block page 5/1 section II.A the Viterbi decoding is done in DEC1 and feed to the mapper), a detector to compare the first symbol to the quantized first symbol, and an oscillator having a tunable output as a function of the comparison (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 54 Langlais et al. teach that the transmitter modulates the first and second symbols on a carrier frequency, and the receiver further comprises a multiplier to multiply each of the first and second symbols with the oscillator output to recover its respective symbol by removing its respective carrier frequency (page 5/1 section I, figure 2 multiplier, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 56 Langlais et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A).

As per claim 57 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 58 Langlais et al. teach that the transmitter further comprises a turbo encoder to turbo encode the signals before transmission to the receiver (page 5/1 section I).

As per claim 59 Langlais et al. teach that the turbo encoder comprises a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal (page 5/2 section II.A last paragraph inherit to the turbo trellis in the receiver will be the trellis in the transmitter and the interleaver).

Claims 1-3, 5-8, 10-11, 15-16, 18-19, 21-22, 24-25, 27-28, 30-31, 33-36, 40-42, 44-45, 47-48, 50-51 and 53-54, 56-59 are rejected under 35 U.S.C. 102(a) as being anticipated by Mottier ("Influence of tentative decisions provided by a Turbo-decoder on the carrier synchronization: Application to 64-QAM signals", COST 254 Workshop on Emerging Techniques for Communication Terminals, Toulouse France July 7-9, 1997, pages 326-330).

NOTE : This paper is reference 5 of Langlais paper.

As per claim 1 Mottier et al. teach a method of processing signals, comprising receiving first and second signals each being modulated on a carrier signal, the first signal preceding the second signal in time (figure 3 sections 2 and 3, pages 327-328); multiplying each of the first and second signals with a reference signal having a reference frequency (figure 3 sections 2 and 3, pages 327-328 multiplier after y(k)); Viterbi decoding the multiplied first signal based on the multiplied first and multiplied second signals (figure 3 sections 2 and 3, pages 327-328, the Viterbi decoding is done in DEC1 and feed to the mapper); comparing the Viterbi decoded first signal to the multiplied first signal (figure 3 sections 2 and 3, pages 327-328); adjusting the reference frequency as a function of the comparison (f figure 3 sections 2 and 3, pages 327-328 output of loop filter); and turbo decoding a signal with adjusted frequency (figure 3 sections 2 and 3, pages 327-328 modulo of turbo-decoder).

As per claim 2 Mottier et al. teach a method where the first and second signals each comprises turbo-encoded data figure 3 sections 2 and 3, pages 327-328.

As per claim 3 Mottier et al. teach that the multiplied first and multiplied second signals each comprises a baseband signal (figure 3 sections 2 and 3, pages 327-328).

As per claim 5 Mottier et al. teach that the comparison of the Viterbi decoded first signal with the multiplied first signal comprises detecting a phase difference between the Viterbi decoded first signal and the multiplied first signal (figure 3 sections 2 and 3, pages 327-328).

As per claim 6 Mottier et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase difference

between the Viterbi decoded first signal and the multiplied first signal (figure 3 sections 2 and 3, pages 327-328, the VCO in inherited in the PLL).

As per claim 7 Mottier et al. teach that the adjustment of the reference frequency comprises adjusting the reference frequency to be substantially equal to a frequency of the carrier signal (figure 3 sections 2 and 3, pages 327-328).

As per claim 8 Mottier et al. teach that the first and second received signals each comprises a symbol representing a constellation point, and where the Viterbi decoded of the multiplied first signal comprises quantizing the multiplied first signal to its nearest constellation point as a function of the multiplied first and multiplied second signals (figure 3 sections 2 and 3, pages 327-328).

As per claim 10 Mottier et al. teach that the transmitting signals including the first and second signals, where the receiving of the first and second signals comprises receiving the transmitted signals (figure 3 sections 2 and 3, pages 327-328).

As per claim 11 Mottier et al. teach that the transmission of the signals comprises turbo encoding the signals before transmission (figure 3 sections 2 and 3, pages 327-328 inherit to the turbo decoder will be a turbo encoder).

As per claim 15 Mottier et al. teach a receiver, comprising: an oscillator having a reference signal output with a tunable reference frequency (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL see figure 3); a multiplier to multiply a first signal with the reference signal, and to multiply a second signal, succeeding the first signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 3 sections 2 and 3, pages 327-328 multiplier

after y(k)); a Viterbi decoder to adjust the multiplied first signal based on the multiplied first and multiplied second signals (figure 3 sections 2 and 3, pages 327-328 the Viterbi decoding is done in DEC1 and feed to the mapper); and a detector to compare the adjusted first signal with the multiplied first signal, the detector being adapted to tune the reference frequency as a function of the comparison (figure 3 sections 2 and 3, pages 327-328 phase detector).

As per claim 16, 22 and 28 Mottier et al. teach that the oscillator comprises a voltage controlled oscillator (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 18, 24 and 30 Mottier et al. teach that the Viterbi decoder comprises a zero trace back Viterbi decoder (figure 3 sections 2 and 3, pages 327-328).

As per claim 19, 25 and 31 Mottier et al. teach that the detector comprises a phase detector to compare a phase of the adjusted first signal with a phase of the multiplied first signal, the phase detector being adapted to tune the reference frequency as a function of a difference in phases (figure 3 sections 2 and 3, pages 327-328 phase detector).

As per claim 21 Mottier et al. teach a receiver, comprising an oscillator having a tuning input (figure 3 sections 2 and 3, pages 327-328the VCO in inherited in the PLL); a multiplier having a first input to receive a signal, and a second input coupled to the oscillator, the signal comprising a first signal and a second signal succeeding the first signal in time, the first and second signals each being modulated on a carrier frequency (figure 3 sections 2 and 3, pages 327-328 multiplier after y(k)); a Viterbi decoder having

an input coupled to the multiplier, and an output (figure 3 sections 2 and 3, pages 327-328 block in dot lines label module of turbo-decoder the Viterbi decoding is done in DEC1 and feed to the mapper); and a detector having a first input coupled to the Viterbi decoder input, a second input coupled to the Viterbi decoder output, and an output coupled to the tuning input of the oscillator (figure 3 sections 2 and 3, pages 327-328 phase detector).

As per claim 27 Mottier et al. teach a receiver, comprising oscillator means for generating a reference signal having a tunable reference frequency (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL); multiplier means for multiplying a first signal with the reference signal, and multiplying a second signal, succeeding the first signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 3 sections 2 and 3, pages 327-328 multiplier after y(k)); Viterbi decoder means for adjusting the multiplied first signal based on the multiplied first and multiplied second signals (figure 3 sections 2 and 3, pages 327-328 block in dot lines label module of turbo-decoder the Viterbi decoding is done in DEC1 and feed to the mapper); and detector means for comparing the adjusted first signal with the multiplied first signal, the detector means comprises tuning means for tuning the reference frequency as a function of the comparison (figure 3 sections 2 and 3, pages 327-328 phase detector).

As per claim 33 Mottier et al. teach a method of processing signals having a first and second symbol each representing a constellation point, the first symbol preceding the second symbol in time, the method comprising Viterbi decoding the first symbol to

its nearest constellation point as a function of the first and second signals (figure 3 sections 2 and 3, pages 327-328 d(k) output of the Viterbi decoder, the Viterbi decoding is done in DEC1 and feed to the mapper); comparing the first symbol to the Viterbi decoded first symbol (figure 3 sections 2 and 3, pages 327-328 phase detector); and adjusting a reference frequency as a function of the comparison (figure 3 sections 2 and 3, pages 327-328 input to the multiplier).

As per claim 34 Mottier et al. teach a method of receiving the first and second symbols before the first symbol is Viterbi decoded (figure 3 sections 2 and 3, pages 327-328 input to the multiplier).

As per claim 35 Mottier et al. teach a method of transmitting the signals including the first and second symbols, where the receiving of the first and second symbols comprises receiving the transmitted signals (figure 3 sections 2 and 3, pages 327-328 input to the multiplier).

As per claim 36 Mottier et al. teach that the transmission of the signals comprises turbo encoding the first and second symbols before transmission (figure 3 sections 2 and 3, pages 327-328).

As per claim 40 Mottier et al. teach that the received first and second symbols are each modulated on a carrier frequency, the method further comprising multiplying each of the first and second symbols with a reference signal having the reference frequency (figure 3 sections 2 and 3, pages 327-328 multiplier).

As per claim 41 Mottier et al. teach that the multiplication of the first and second modulated symbols each comprises recovering the respective symbol by removing the

respective carrier frequency (figure 3 sections 2 and 3, pages 327-328 inherit to the multiplier).

As per claim 42 Mottier et al. teach that the first and second symbols each comprises turbo encoded data (figure 3 sections 2 and 3, pages 327-328).

As per claim 44 Mottier et al. teach that the comparison of the first symbol with the quantized first symbol comprises detecting a phase difference between the first symbol and the Viterbi decoded first symbol (figure 3 sections 2 and 3, pages 327-328 phase detector).

As per claim 45 Mottier et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase difference between the first symbol and the Viterbi decoded first symbol (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 47 Mottier et al. teach a receiver to receive a signal including first and second symbols each representing a constellation point, the first symbol preceding the second symbol in time, the receiver comprising a Viterbi decoder to quantize the first symbol as a function of the first and second symbols (figure 3 sections 2 and 3, pages 327-328 turbo-decoder block the Viterbi decoding is done in DEC1 and feed to the mapper); a detector to compare the first symbol to the quantized first symbol (figure 3 sections 2 and 3, pages 327-328 phase detector); and an oscillator having a tunable output as a function of the comparison (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 48 Mottier et al. teach that the first and second symbols are each modulated on a carrier frequency, the receiver further comprising a multiplier to multiply each of the first and second symbols with the oscillator output to recover its respective symbol by removing its respective carrier frequency (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 50 Mottier et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 3 sections 2 and 3, pages 327-328 phase detector).

As per claim 51 Mottier et al. teach that the oscillator comprises a voltage controlled oscillator (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 53 Mottier et al. teach a communication system, comprising a transmitter to transmit a signal including first and second symbols each representing a constellation point, the first symbol preceding the second symbol in time (figure 3 sections 2 and 3, pages 327-328); and a receiver including a Viterbi decoder to quantize the first symbol as a function of the first and second symbols (figure 3 sections 2 and 3, pages 327-328 turbo-decoder block the Viterbi decoding is done in DEC1 and feed to the mapper), a detector to compare the first symbol to the quantized first symbol, and an oscillator having a tunable output as a function of the comparison (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 54 Mottier et al. teach that the transmitter modulates the first and second symbols on a carrier frequency, and the receiver further comprises a multiplier

to multiply each of the first and second symbols with the oscillator output to recover its respective symbol by removing its respective carrier frequency (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 56 Mottier et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 3 sections 2 and 3, pages 327-328 phase detector).

As per claim 57 Mottier et al. teach that the oscillator comprises a voltage controlled oscillator (figure 3 sections 2 and 3, pages 327-328 the VCO in inherited in the PLL).

As per claim 58 Mottier et al. teach that the transmitter further comprises a turbo encoder to turbo encode the signals before transmission to the receiver (figure 3 section 1, page 326).

As per claim 59 Mottier et al. teach that the turbo encoder comprises a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal (figure 3 sections 2 and 3, pages 327-328 inherit to the turbo trellis in the receiver will be the trellis in the transmitter and the interleaver).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9, 13-14, 20, 38-39 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langlais et al. as applied to claims 1, 11, 15, 35, and 33 above in view of Divsalar (US 6023783 A), and further in view of Berrou (US 5446747 A). Langlais teach claims 1, 11, 15, 33 and 35. Langlais discloses a turbo encoder comprised with two trellis encoders separated by an interleaver. Langlais doesn't disclose two (or more) trellis encoders separated by interleavers may be used, and puncturing the parity bits. Divsalar discloses two (or more) trellis encoders separated by interleavers may be used (figure 2 column 5 line 37 column 12 line 14). Langlais and Divsalar teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate the multiple encoders disclosed by Divsalar with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to improve the performance of the decoder (Divsalar abstract). Berrou discloses puncturing the parity bits in transmission and in reception (figure 2 block 15 and figure 4 block 42, column 9 lines 15-52; and column 12 lines 12-22). Langlais and Berrou teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate the puncturing technique disclosed by Berrou with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to improve the data rate of the system (Berrou column 9 lines 15-52). Therefore, it would have been obvious to combine Langlais with Divsalar and Berrou to obtain the invention as specified in claims 9, 13-14, 38-39 and 46.

Claims 12, 20, 26, 32, 37,52 and 59-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langlais et al. as applied to claim 11 above, and further in view of Robertson et al., "Bandwidth-Efficient Turbo Trellis-coded Modulation Using Punctured Component Codes," IEEE Journal on Selected Areas in Communications; 02/1998,.p.p. 206-218,. Vol. 16, No. 2).

As per claims 12, 37 and 61 Langlais teach claims 11, 36 and 58. Langlais doesn't specifically teach that the signals comprise interleaving and de-interleaving of the turbo encoded signals before transmission. Robertson teaches that the turbo-coded transmitted signals comprise interleaving and de-interleaving of the turbo encoded signals before transmission (figure 2 and 2 page 208 section II the encoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate the interleaving and de-interleaving of the turbo encoded signals before transmission taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the first encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Langlais and Roberson to obtain the invention as specified in claims 12, 37 and 61.

As per claims 20, 26, 32 and 52 Langlais et al. teach claims 15, 21, 27 and 47. Langlais doesn't teach a switch between the multiplier and the Viterbi decoder input. Robertson teaches a switch between the multiplier and the decoder input (figures 4 and

5 pages 211, 212 and 213 section III the decoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Langlais and Roberson to obtain the invention as specified in claims 20, 26, 32 and 52.

As per claim 59 Langlais et al. teach claim 58. Langlais doesn't specifically indicate the turbo encoder comprising a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal. Robertson specifically teaches (title: "...turbo trellis-coded...") a turbo encoder comprising a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal (figures 1 and 2 page 207 section II the encoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to supplement the turbo trellis code and the interleaving turbo-trellis encoded signals taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would

have been to obtain a more powerful bandwidth-efficient encoder (Roberson page 206 abstract). Therefore, it would have been obvious to combine Langlais and Roberson to obtain the invention as specified in claim 59.

As per claim 60 Roberson and Langlais teach claim 59. Roberson also teaches that the receiver further comprises a switch positioned before the Viterbi decoder to pass only the first portion of the signal to the Viterbi decoder (introduction and figures 4 and 5 pages 211, 212 and 213 section III the decoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Langlais and Roberson to obtain the invention as specified in claim 60.

Claims 9, 13-14, 20, 38-39 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mottier et al. as applied to claims 1, 11, 15, 35, and 33 above in view of Divsalar (US 6023783 A), and further in view of Berrou (US 5446747 A). Mottier teach claims 1, 11, 15, 33 and 35. Mottier discloses a turbo encoder comprised with two trellis encoders separated by an interleaver. Mottier doesn't disclose two (or more) trellis encoders separated by interleavers may be used, and puncturing the parity bits.

Divsalar discloses two (or more) trellis encoders separated by interleavers may be used (figure 2 column 5 line 37 column 12 line 14). Mottier and Divsalar teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate the multiple encoders disclosed by Divsalar with the carrier recovery scheme taught by Mottier. The suggestion/motivation for doing so would have been to improve the performance of the decoder (Divsalar abstract). Berrou discloses puncturing the parity bits in transmission and in reception (figure 2 block 15 and figure 4 block 42, column 9 lines 15-52; and column 12 lines 12-22). Mottier and Berrou teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate the puncturing technique disclosed by Berrou with the carrier recovery scheme taught by Mottier. The suggestion/motivation for doing so would have been to improve the data rate of the system (Berrou column 9 lines 15-52). Therefore, it would have been obvious to combine Mottier with Divsalar and Berrou to obtain the invention as specified in claims 9, 13-14, 38-39 and 46.

Claims 12, 20, 26, 32, 37,52 and 59-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mottier et al. as applied to claim 11 above, and further in view of Robertson et al., "Bandwidth-Efficient Turbo Trellis-coded Modulation Using Punctured Component Codes," IEEE Journal on Selected Areas in Communications; 02/1998,.p.p. 206-218,. Vol. 16, No. 2).

As per claims 12, 37 and 61 Mottier teach claims 11, 36 and 58. Mottier doesn't specifically teach that the signals comprise interleaving and de-interleaving of the turbo encoded signals before transmission. Robertson teaches that the turbo-coded transmitted signals comprise interleaving and de-interleaving of the turbo encoded signals before transmission (figure 2 and 2 page 208 section II the encoder). Mottier and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to integrate the interleaving and de-interleaving of the turbo encoded signals before transmission taught by Roberson with the carrier recovery scheme taught by Mottier. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the first encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Mottier and Roberson to obtain the invention as specified in claims 12, 37 and 61.

As per claims 20, 26, 32 and 52 Mottier et al. teach claims 15, 21, 27 and 47. Mottier doesn't teach a switch between the multiplier and the Viterbi decoder input. Robertson teaches a switch between the multiplier and the decoder input (figures 4 and 5 pages 211, 212 and 213 section III the decoder). Mottier and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Mottier. The suggestion/motivation for doing

so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Mottier and Roberson to obtain the invention as specified in claims 20, 26, 32 and 52.

As per claim 59 Mottier et al. teach claim 58. Mottier doesn't specifically indicate the turbo encoder comprising a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal. Robertson specifically teaches (title: "...turbo trellis-coded...") a turbo encoder comprising a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal (figures 1 and 2 page 207 section II the encoder). Mottier and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to supplement the turbo trellis code and the interleaving turbo-trellis encoded signals taught by Roberson with the carrier recovery scheme taught by Mottier. The suggestion/motivation for doing so would have been to obtain a more powerful bandwidth-efficient encoder (Roberson page 206 abstract). Therefore, it would have been obvious to combine Mottier and Roberson to obtain the invention as specified in claim 59.

As per claim 60 Roberson and Mottier teach claim 59. Roberson also teaches that the receiver further comprises a switch positioned before the Viterbi decoder to

pass only the first portion of the signal to the Viterbi decoder (introduction and figures 4 and 5 pages 211, 212 and 213 section III the decoder). Mottier and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Mottier. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder. Therefore, it would have been obvious to combine Mottier and Roberson to obtain the invention as specified in claim 60.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres
01-31-2006

KEVIN BURD
PRIMARY EXAMINER